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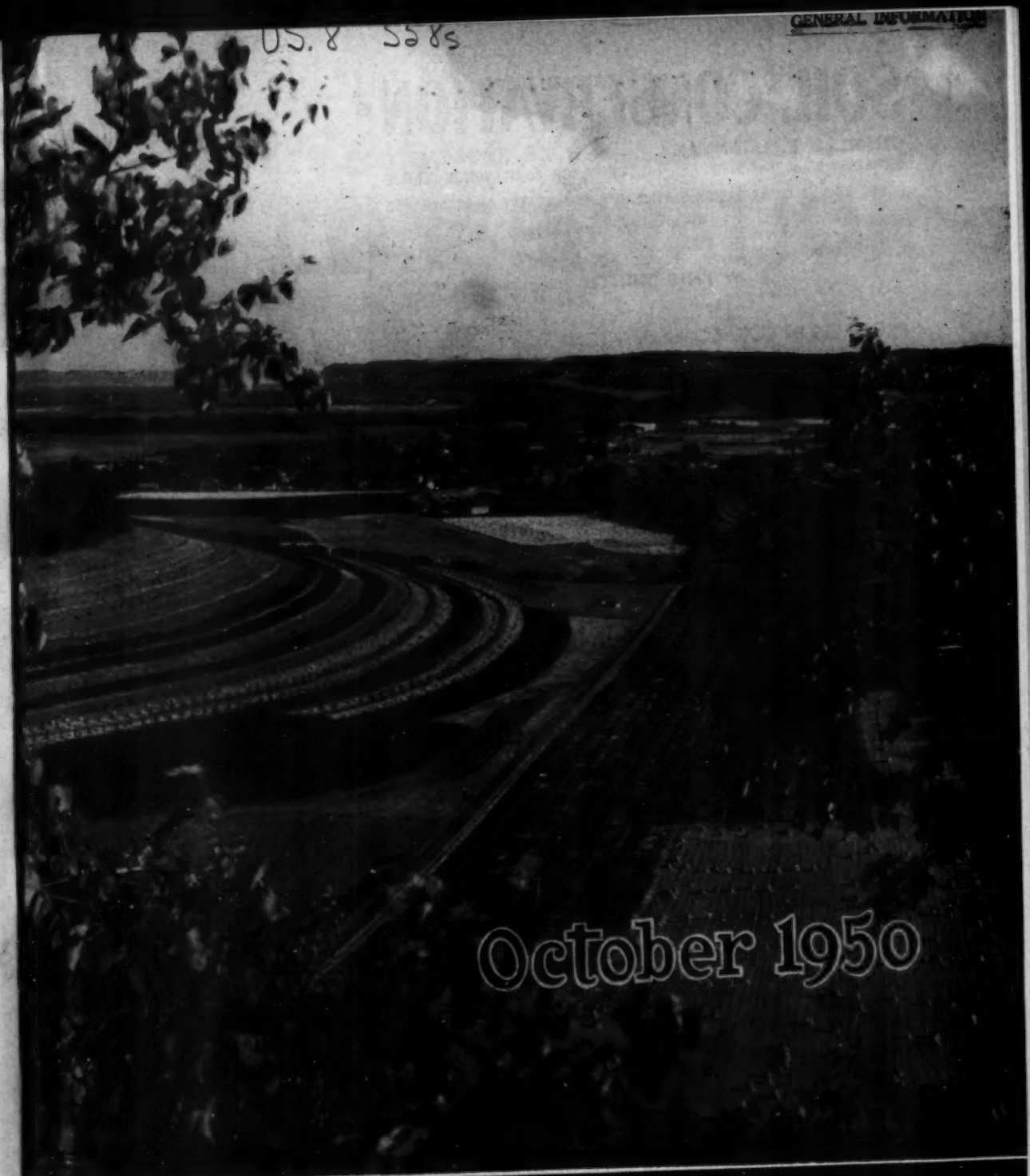

October 1950

SOIL CONSERVATION

OFFICIAL ORGAN OF THE SOIL CONSERVATION SERVICE

SOIL CONSERVATION •

OCTOBER—1950
VOL. XVI—NO. 3

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ISSUED BY SOIL CONSERVATION SERVICE, U. S. DEPARTMENT OF AGRICULTURE
WASHINGTON, D. C.

☆ THIS MONTH ☆

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WELLINGTON BRINK
Editor
Art Work by
W. HOWARD MARTIN

SOIL CONSERVATION is published by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business, with approval of the Director of the Budget. SOIL CONSERVATION supplies information for workers of the Department of Agriculture and others engaged in soil conservation.

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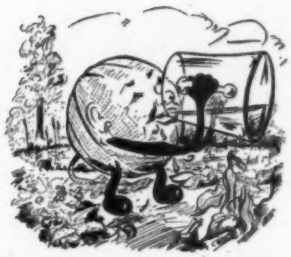

POND LICKED DROUGHT.—No matter how severe a drought ensues, Capella brothers, market vegetable growers in Erie County, N. Y., know that they'll have water for irrigation.

Their 1-acre pond, built in 1948 with the technical assistance of Soil Conservation Service men working with the Erie County Soil Conservation District, saved 4 acres of melons and 35 acres of beans during the long tough dry spell in 1949. The pond is 14 feet deep and cost around $2,000. "It paid for itself right then," says Carl Capella.

Portable irrigation equipment is used. "On our Vial Road farm," Carl declares, "drought cost us a berry crop that would have paid for several ponds if we had had one over there."

Harvest hands use the pond for swimming. It will be lighted next winter and become a commercial skating center.

FRONT COVER.—The George Nelson farm, in Houston County, Minn., is planted largely to fruit trees and on sloping land the rows are on the contour. Some of the level land is in grain, corn, and truck crops. Photo by Lathrop.

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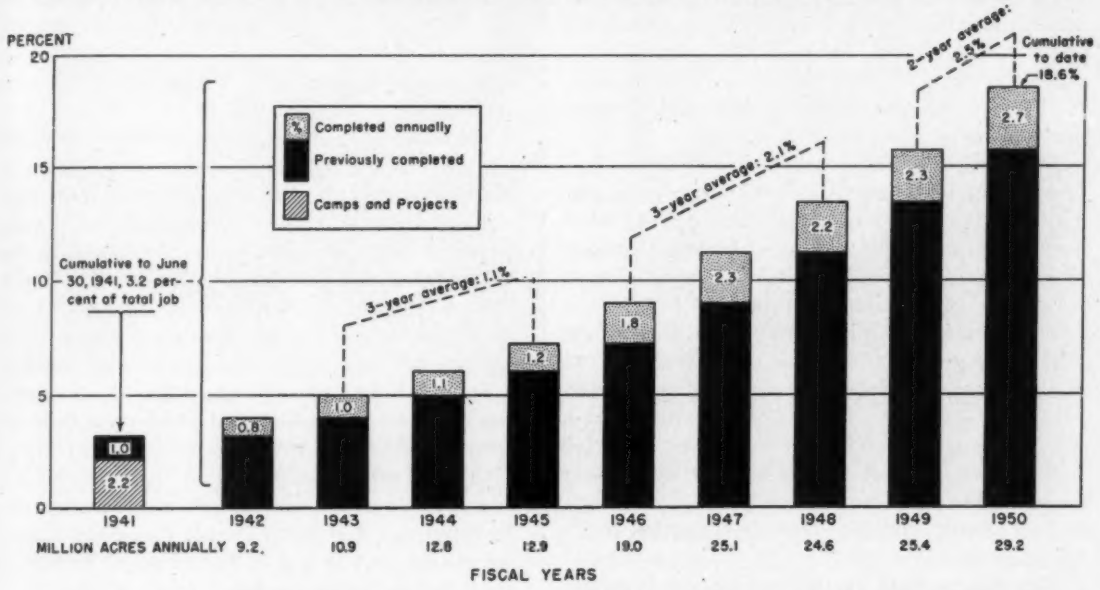
Progress in SOIL CONSERVATION



By HUGH BENNETT

LET'S get the facts straight on the progress we are making on our Nation's soil conservation job. Once the facts are known, there will be less talk of "slow" progress. The record is an amazing one. All real friends of conservation can be proud of it. And it is getting better every day. The actual chart of accomplishment strikingly reveals the inaccuracy of a careless remark that recently came to my ears: "At the present rate, it will take over a hundred years to finish the soil conservation job!"

Such statements are based on misinformation. The rate of progress is very much greater per dollar spent today than it was in the earlier years, and the trend is steadily upward. On the whole, the soil conservation picture is a cheerful one. This article will tell you just where we stand and how fast we are going and how long it will take to finish the job up to the stage of maintenance and improvement.

While we admittedly are not moving fast enough and are still suffering heavy losses of soil, we are, nevertheless, moving ahead at a rate that is anything but discouraging. I don't mean that any of us is at all satisfied with present progress; we are not satisfied, and are constantly seeking improvements for accelerating progress. We have greatly increased progress in the past; and I see no reason why we can't continue to build up momentum. It is my belief, given adequate facilities, that we can get the job of applying the basic conservation measures to the land completed by about 1970—around 20 years from now.

This estimate is based on what has been done thus far, together with the continuing upward trend. At the end of the first 7 years of work, in 1941, the Soil Conservation Service had directed the conservation treatment of 26,600,000 acres, an

NOTE.—The author, Chief of the Soil Conservation Service, was assisted by R. W. Rogers of the division of records and reports.

average of 3,800,000 acres annually for the first 7 years.

The total soil conservation job, in 1941, comprised all lands classified as "in farms," or 1,098,000,000 acres (Census 1945). This does not include areas occupied by roads, lanes, farmsteads, etc.

During 1942 the principal conservation measures were applied to approximately 5,000,000 acres (in soil conservation districts); in 1949 the same kind of treatment was applied to 22,000,000 additional acres. *This was an increase of 340 percent—yearly 4½ times as much work done—with operating facilities increased during this second 7-year period by only 43 percent.*

In addition to the conservation measures applied to the land, much farm planning work and many soil conservation surveys were carried out—enough for a healthy backlog of essential preliminary work to avoid delay in the preparation of necessary conservation farm plans.

But there is still a long way to go, and we are still losing great quantities of soil. However, we have learned how to control erosion on practically all kinds of land, and we are controlling it at a much faster rate than the public realizes. The job is being done at a rate so much faster than I ever expected to see, even so recently as 15 years ago, I feel almost jubilant over the progress that's being made.

The figures used in this article are from the records of the Soil Conservation Service. Other agencies, Federal, State, and private, have made contributions, to be sure; but I have not examined their books. The material here relates to the use of needed soil conservation measures on farms for which complete conservation plans have been made on an acre-by-acre basis by our technicians. These farm plans have been guided by the physical land facts revealed in our soil conservation surveys—which no other agency makes.

In considering the rate of progress on so prodigious a job as conserving the productive lands of the United States while using them, a major point to be considered is whether or not progress is speeding up from year to year. This has much to do with an appropriate appraisal of the rate at which any long-time job can be completed.

As to finishing the job, actually there is no end to it, because when the basic conservation measures have been applied to the land there will be the continuing task of maintenance. This is true of all the works of man. If not maintained, they eventually disappear through neglect.

Our Soil Conservation Service way of conserving soil is markedly different from anything that has ever been done in the whole recorded history of man. It is based on nature's highly successful method of keeping the productive land she builds permanently productive. Nature accomplishes this through the operation of what undoubtedly is the most nearly perfectly balanced program of soil building and soil conservation conceivable. The basic principle of her ideal method is perfect coordination between land, water, vegetation, and animals (with the exception of civilized man).

The closer we can follow this pattern, the better the job will be. Under a good cover of grass or forest, for example, our measurements show that only a trace of soil is lost by erosion, and a much larger proportion of the rainfall is stored in the reservoir of the soil for plant growth. Under these conditions the negligible loss of soil from the surface of the ground is doubtless compensated for by soil building from the material beneath.

So, it is a mandate of nature that the land and the water which makes land productive must be treated and used according to need and capability if the land is to be preserved. I am repeating this concept because it needs all the emphasis that can be given it. Too many people still don't understand that this is one of the physical facts that man cannot change or amend.

For the cultivated crops, our program of modern soil conservation calls for, along with other things, coverage of the land throughout the year with some form of dense vegetation or mulch as much of the time as can be fitted into practical farm practice. Results obtained from our principal conservation practices when used in mutual support of one another (if the character of the land calls for such support) show a degree of effectiveness, as well as can be measured, of something like 85 to more than 95 percent of perfection. The degree of effectiveness will be increased as crop rotations and other measures add organic material and otherwise improve the soil.

In the beginning, our work proceeded slowly, probably more because of its newness than anything else. I proposed the type of program we are using because I felt at the start it was the only possible way to lasting conservation of productive land. I had learned this through continuing study of soils, soil erosion, and land use

Nine years of progress: These aerial photographs of an identical area—about 35 farms south and west of Loganville, York County, Pa.—show how application of conservation practices by farmers shifting from square to contour operations has changed the land pattern.

over a period of 30 years. I had mapped soils in the old Bureau of Soils and later had set up and directed the work of the erosion experiment stations in the Bureau of Chemistry and Soils. Most of the basic data we have relating to rates of soil and water losses for different kinds of land, used for different purposes, as well as the principal erosion-control measures, were developed on these stations. These original experiment stations, and their successors, cooperating with State stations have also developed the great majority of the control measures being used at the present time.

I was sure in the beginning that my proposal for completely coordinated treatment of the land was scientifically sound—that for enduring soil conservation, *treatment of the land on the basis of kind and need* was just as much a physical fact as the fact that water will not run up hill on its own power. In other words, our conservation method was based on the closest possible adjustment with reality, as relating to soil, slope, water, and proper land use.

I understood, also (as the result of 30 years' study of the land), that there was no short cut—no other way—to get the soil conservation job done with any chance of permanency. Farmers, generally, and others, however, had to be shown.

So, in the beginning our progress did not move out very fast. It was necessary to explain every detail of the work to farmers. Now that great numbers understand the program, not so much time is required, generally, for detailed explanation.

During the first 7 years of the life of the Soil Conservation Service—by the end of the fiscal year 1941—the part of the total conservation job completed on the farm land of the Nation (excluding national forests, parks, public domain, and certain other public-owned areas) amounted to only 3.2 percent. This was an average annual rate of less than 0.5 percent. In the fiscal year 1942, eight-tenths of 1 percent of the job was completed. By 1950 the annual rate of treatment had increased to 2.7 percent of the total job; that is, the rate of progress 7 years later was more than three times as fast.

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Our figures up to June 30, 1950, show that 18.6 percent of the conservation job had been completed. In addition, there had been a considerable spread of practices to thousands of farms both inside and outside of soil conservation districts, for which we have no records. We have completed, in other words, around one-fifth of the total job; but in considering the results I must repeat, for the sake of emphasis, the fact that *the rate of progress is speeding up.* During the 3-year period of 1943 to 1945, inclusive, the rate of progress averaged 1.1 percent of the total job annually, while for the 3-year period of 1946 to 1948, inclusive, the average rate had increased to 2.1 percent of the total job—about doubled.

It is this last figure showing a doubled rate of progress that is so very significant in any proper estimate of the rate at which the job is being done. I had urged our technicians to double the rate of progress in 1 year. It took 3 years, however, to reach this Nation-wide goal, but progress was doubled in a good many States within the 1-year period.

If we can raise the annual rate of application of effective conservation measures a little more—and this can be done with adequate facilities—it will not be long now until we can begin to see the goal which for so long has seemed so far off.

We are urging the completion of at least an average of 4 percent of the job annually during the coming 3-year period. Nationally, this would mean an average annual rate of around 60 million acres inventoried (surveyed), 50 million acres of farm land planned for conservation, and 40 million acres treated each year during the fiscal years of 1952 to 1954, inclusive. This would be a goal well worth our utmost efforts to achieve. I feel it can be achieved, and that when that's done progress can be still further increased. If we can do this, then the Nation can be assured that the indispensable soil conservation job will be finished on time.

I think it is important to mention the further highly encouraging fact that we could not have done so much work as we have but for the splendid cooperation we have had with soil conservation districts—in which the farmers are working together far more effectively than they have ever done before. Furthermore, we are cooperating with some 30,000 natural neighbor groups in soil conservation districts. We have already gone far enough with this new device (working with neighbor groups) to know how to use it effectively.

And there is still another point in connection with the work which, when properly understood, may be helpful toward a clearer understanding of the vital importance of sound and enduring soil conservation:

Soil conservation of the kind I am discussing is an indispensable part of our first line of national defense. The other indispensable part of our first line of national defense is, of course, strong soldiers, guns, and bullets. The two—adequate food from productive land for adequate defense—are mutually sustaining; one cannot exist without the other. If we lose our soil, there will be little to defend, and only hungry soldiers for defense.

Let's keep diligently on with our efforts to speed up the work; and let's be neither complacent nor despondent. Let's think occasionally like farmers in some of the soil conservation districts, who are beginning to talk about planning proper celebration of the completion of the conservation job in their districts. In 93 districts 80 percent or more of the conservation farm plans have been completed; in 16 districts treatment has been completed by 80 percent or more. Treatment has been completed for half or more of the farms of 105 districts. This is most encouraging. More and more farmers in districts will be looking to the time when their districts can have these celebrations.

I predict there will be no turning back with the soil conservation job, now moving ahead with such gratifying promise. A million farmers in soil conservation districts and under other programs of the Service have now experienced firsthand the benefits that come from practicing soil and water conservation of the modern kind. There was a time when they had to take somebody's word as to whether or not it would pay; but enough of them in a sufficient number of representative places throughout the country now know, out of their own experiences on their own farms, what these benefits are. There is no longer any question, in my opinion, as to whether the conservation program will be continued. It will be, I predict.

There was a time, however, when everything depended on the outcome in hearings before committees and administrative officers, who handed down decisions and directives. The essential elements of that will continue; but from now on, I believe, the case of soil conservation will not be

(Continued on page 68)

DISTRICT PROFILE

HARRY SNAVELY of PENNSYLVANIA

Harry Snavely, 79-year-old chairman of the board of directors of the Lancaster County (Pa.) Soil Conservation District, puts men into three classes: "wazzers," "issers," and "willers." Since he partially retired in 1946, he claims membership in the first.

Snavely is still enough of an "izzer" to have taken his first plane ride, when he flew to the 1950 convention of the National Association of Soil Conservation Districts, an undertaking that landed him on the first page of the *Atlanta Journal.*

This Lancaster dairyman has been a front runner in local affairs since the day in 1898 when he started to operate his 119-acre farm. At that time, says W. Martin Muth, district conservationist, young Snavely envied his neighbors' farms; now the neighbors may well envy Snavely. Snavely's place leads in productivity and protection from erosion and soil depletion.

He laid out his first straight strips in 1914, combining them with a good rotation, cover crops, and plenty of manure. A firm believer in the place of good livestock on the farm, he went to Europe that year and imported some of the county's first purebred Guernseys. His 35 milkers average 450 pounds of butterfat and 10,000 pounds of milk per year. These are backed by 25 young replacements and 2 bulls.

Long concerned with community improvement, Snavely saw the need for a soil conservation district. When 15 of the county's 42 townships voted to form a district in 1938, Snavely was elected to the first board of directors. He has served as chairman since 1947, and had one of his fondest hopes realized when the rest of the townships joined the district in March 1950.

But Snavely himself took his own sweet time about a conservation plan for his farm and spent 5 years in careful observation. Others, he felt, needed help more than he. Finally, in 1942 he worked one out with SCS personnel and his farm quickly moved to the forefront. The whole farm has been revamped to accommodate strip cropping on the contour. Snavely has relocated fences, retired erodible land to pasture for his high-producing herd, planted some parts to trees, and built a farm pond with his own equipment. He uses the pond for fishing and leaves the swimming to his nephew Snavely Garber, his nephew's wife, three grandnephews and grandnieces, and others of the younger set.

Harry H. Snavely.

While Snavely's farm is marked by the more obvious conservation practices and his new white dairy barn, there's more to it than milk. Among the crops are corn, wheat, barley, hay, tomatoes, tobacco, peas, lima beans, and plenty of rotation pasture. Nephew Garber handles most of the actual farming now, while his wife takes care of the herd replacements and manages nearly 500 hens that produce at better than a 70-percent clip. But Harry Snavely himself was one of the first master farmers selected by the *Pennsylvania Farmer.*

A born public servant and organizer, Snavely has had many more pies than fingers to put in them. Besides buttonholing Lancaster County's traditionally cautious Pennsylvania Dutch farmers to tell them about conservation farming and what they can expect from it, he has served as county treasurer, director of the Pennsylvania State Farm Show Commission, president of the Lancaster County Sunday School Association, and

member of the Board of the Mennonite Home of Lancaster County.

Snavely calls himself a lazy man and likens himself to the pious but willing soul who told the Lord that he would be willing to serve Him in any capacity, as long as it was advisory. Snavely served as a State director of the Guernsey Breeders' Association. He promoted Hampshires for 20 years and shipped his breeders to many States and South America, besides serving as State secretary of the Hampshire Breeders' Association. He has also served as local representative, director, and executive board member for the Eastern States Farmers Exchange; and for 30 years has been a director of the Northern Mutual Fire Insurance Company.

Many of the labor-saving devices on the Snavely farm have been built by Nephew Garber. They include everything from an automatic barn cleaner to a tomato picker. Among these devices, too, are automatic doors on the two bull pens, powered by a discarded washing-machine motor. This saves anyone the necessity of getting too close to the animals. Not that he doesn't trust them, Snavely explains, for he admits that he'll scratch their backs anytime—through the bars with a tobacco lath.

As side lines, the Snavely farm boasts a fruit and nut orchard on whose trees Snavely did the grafting. And just to make sure that there's sufficient force on hand to help nature with its pollination, for a little extra income and sweets on the table, he keeps 10 bee colonies.

"Snave," as he's known to his friends, admits that air-line hostesses are prettier than bus drivers, but claims that the planes themselves are no more comfortable than buses. He'll agree that they save a lot of time, but "Now that I've retired, time is all I've got." And he'll use it to spread the word on conservation farming.

—MATTHEW S. MIRANTZ.

MODERN LANDSCAPE.—Reared with an understanding and appreciation of the land, Coreen Mary Spellman, teacher of art at the Texas State College for Women at Denton, Tex., was merely putting on paper her mental picture of a conservation farm when she painted "Contour Plowing."

Her water color was on exhibit at Will Rogers Memorial Coliseum during the 1950 Southwestern Exposition and Fat Stock Show in Fort Worth. It attracted the attention of thousands of show visitors.

Coreen Mary Spellman.

"Contour Plowing."

This bridge was washed out by the May 10–11 storm.

RECORD STORM PROVES VALUE OF *Control Measures on Farms*

By LOUIS P. MERRILL

THE RAINS that fell on May 10 and 11 in south-central Oklahoma were the kind that are likely to occur only once in 50 years. In fact, the old-timers recall that the only comparable rainstorm fell back in 1908, 42 years ago.

The water this time came in heavy, sluicing downpours that pounded the land as if from jets. At Wayne, in the Washita River watershed, 4 inches fell in 40 minutes. At Purcell nearby, 15.5 inches fell in 30 hours, 13.6 inches of it in 24 hours. Perhaps the most damaging flood on record occurred along the main stem of the Washita from Lindsay to Davis.

The runoff waters gathered in stream channels, tore across lowlands, and ripped out levees, roadways, and bridges. In the towns of Duncan, Pauls Valley, Comanche, Waurika, and Maysville 1,250 people were made temporarily homeless. Twenty-four homes were destroyed and 67 incurred major damage.

Altogether, in dollars, the damage on the Washita and Red River watersheds was estimated at $17,784,000. This included the loss of 29,500,000 tons of topsoil at a nominal value of 25 cents a ton. Crop losses accounted for $2,537,500 of the total, and damage to roads and bridges came to $2,478,000 more. Other items included damage to homes and other property in cities, farm homes and equipment, stored crops, livestock, fences, ponds, terraces, and levees.

Two lives were lost.

In Owl Creek watershed near the town of Wayne, Rual Leveridge looked about after the rain had stopped on May 11 for a way to tell how much rain had fallen. An oil can near the house had been empty before the rain. Leveridge measured the depth of the water with his hand. The level was well up on his wrist. Eleven inches, he figured, in a can narrowed somewhat at the top.

In the neighboring watershed of Finn Creek, Walter Gray tried to keep up with the little rain gage out near the barn. The gage held 5 inches. Twice when Gray emptied it, the gage was running over. Then it filled to the 2-inch level by the afternoon of May 11.

In Owl Creek, a tributary stream of the Washita River, the Soil Conservation Service had planned and carried to partial completion the kind of agricultural flood-control program which Congress in 1944 authorized for the Washita.

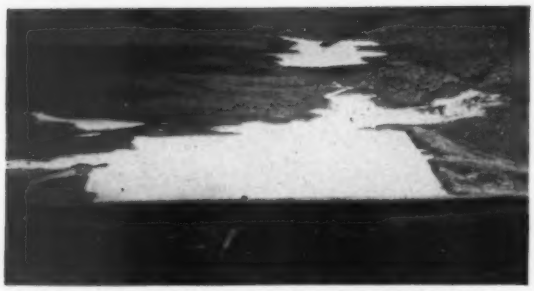
Within the preceding year four detention reservoirs had been built in that watershed. Others had been planned, but no construction done.

However, the effect of the four dams in protecting cropland, stock, fences, and other property in bottom lands below was convincing.

One of the reservoirs was on Leveridge's farm, another on the nearby farm of R. H. Atkins.

When Finn Creek went out of its banks on May 10–11, it left sediment 1 to 12 inches deep over 100 acres of bottom land.

NOTE.—The author is regional director, Soil Conservation Service, Fort Worth, Tex.



Site No. 1 detention reservoir, empty before storm, reached peak flow on May 18, when this picture was made. Water filled permanent pool and rose 30 inches above lip of draw-down pipe. But for this reservoir, land below would have flooded.

Leroy Burnett did not, as in previous years, have to replace this water-gap fence after the spring floods.

Burnett's 12-acre field of growing corn was safeguarded; it lies immediately below detention reservoir No. 5. Before this protection he lost crops 7 years straight as result of floods.

Reservoir No. 1, on the Atkins place, has a drainage area above it of 500 acres. Its surface area at spillway level is 33.8 acres. The smaller reservoir, No. 2, receives water from a drainage area of 200 acres, and its water area at spillway level is 13.2 acres.

Leveridge has 30 acres of good bottom land on Owl Creek below the two reservoirs. It is his most productive land. He started farming it 20 years ago, and for the first few years the yields in corn and other crops were good. In later years, however, when rains were more frequent and heavier, the stands were not so good. Flooding damaged the crops and Johnsongrass moved in.

Leveridge had not regarded the protection of the dams as being too reliable. Years ago he tried straightening the creek channel to speed the flow of runoff water. That helped some, but he continued to lose crops from overflow year after year. However, in the May 10 and 11 rains, the water behind the dams barely reached spillway level. The creek stayed in its banks. And, after seeing the results of the protection given by the dams under such intense rainfall, Leveridge became enthusiastic about his 30 acres of bottom land. He means to do some leveling and filling, and there are some trees that ought to come out to make cultivation easier.

"There's quite a bit to be done," he said, "but this bottom land now has good possibilities. I'm going to improve it. It can grow good crops."

The fact that the water did not flow through the spillway of either dam is in itself significant. The reason lies in the thick stands of grass in the drainage area. The area is in good pasture grasses, mainly little bluestem. Rain falling on the grass moved slowly toward the reservoirs. Much of it soaked into the ground.

Below the Leveridge farm, Scott Brown, before the storm, had harvested alfalfa from eight bottom-land acres. His land showed no damage.

A mile and a quarter to the east is detention dam No. 4, on another small branch emptying into Owl Creek; and about the same distance to the southeast is No. 5, on still another small branch.

The drainage area for No. 4 is 300 acres, with 70 acres in cultivation, 220 acres in pasture, range, and woods, and 10 acres in abandoned cropland. The large acreage in cultivated land made the rate of runoff greater than for the drainage areas of dams 1 and 2. At one time during the runoff period, the water depth in the spillway was 1.8

feet, with 170 acre-feet of water behind the dam. This structure and dam No. 5 were completed late in 1949 and the sod covering was not well established.

SCS Engineer Harry Maricle of the Purcell Work Unit estimates that although this reservoir's spillway was in action only a few hours, its 18-inch draw-down tube discharged water for 90 hours. This meant that the capacity of the reservoir would have filled two and one-half times during the runoff period.

Immediately below dam No. 4 lives the family of R. L. Webster, across the road from the creek channel but nonetheless well down in the flood plain. The Webster barn is on the stream side of the road.

At the peak of the spillway discharge, the water came a foot up on the foundation of the Webster home. It ran into the barn 2 feet or so deep. The Websters were convinced that had it not been for the dam, the water would have been several feet deep in their home and that some calves would have been lost.

L. F. Powell and his brother Sam were cultivating 25 acres of corn on bottom land below the Webster place. L. F. said the rain and flooding were the worst he had seen in the 35 years he had lived there. However, he estimated the damage to his bottom-land corn stand at only about $25 and gave credit to the dam. "If it hadn't been for that dam, the whole crop would have gone."

Early in the morning of May 11, Leroy (Buck) Burnett looked from his home up at the detention dam No. 5. He noted a bare section on the back side of the structure where the protecting Bermuda-grass sod, which was not firmly established, had given way.

He was concerned for a while—perhaps the dam wasn't going to stand the strain. But Dick Long, a neighbor who had seen such dams actually built, was reassuring.

"Every one of those dams will be there when most of the folks around here are gone," was Long's firmly expressed opinion. Long believes that the four dams saved Santa Fe railroad bridges farther downstream, near Paoli.

Burnett had been farming a 12-acre bottom-land field every year for 7 years. He had never made a crop because of the yearly floods. One year he got oats in shock—about 40-bushels-per-acre yield—but flooding cleaned it all out, taking the

Detention reservoir No. 5: Harry Maricle, SCS engineer, indicates high watermark after May 10–11 downpour.

Break in levee along State Highway 24, 8 miles west of Wayne.

Detention reservoir No. 4: Dick Long, farmer, points to high water level reached during downpour of May 10 and 11, when 15 inches fell in 30 hours; 18-inch draw-down pipe ran 90 hours, water ran brief period over spillway, reservoir filled two and one-half times in 72-hour stretch.

Mrs. R. L. Webster, who lives below detention reservoir No. 4, shows top level of water on morning of May 11. It would have risen 2 feet inside this home, say the Websters, had it not been for the dam.

fences along. The loss ran to more than $500.

Year before last, following a heavy rain, Burnett swam a horse in that same bottom land. This year, in spite of the fact that the rainfall was three times as great, there was no flooding of the field. The stand of corn was undamaged, and Burnett was sure he was going to make a crop at last. Also, for the first year since he came to the place he did not have to replace the water gap where his fence crosses the creek.

Burnett was another farmer who, before the dams were built, was not certain they would be of great value. Now he says: "If they'll build enough of them, they'll do a whole lot to help stop this flooding."

Further downstream, after several small branches and the larger East Owl Creek had begun emptying their floodwaters into the main Owl Creek stem, the benefits of the flood-control works were not in evidence. Earl Carder, on Owl Creek southwest of Paoli, for example, estimated his flood loss at $600 in oats, broomcorn, and cotton.

"I'd sure like to see some more of that flood-control work around here," was Carder's comment.

L. P. Wigley, near Paoli, reported he lost 600 bales of hay and a half mile of fence.

On the eastern limits of Paoli, Mrs. J. L. Gooch could look far across the creek valley. The floodwaters May 11 were more than a quarter mile wide across the sweep of bottom land. They covered the highway going east. They slipped across the Santa Fe tracks near the Gooch home and lapped into the chicken yard. Mrs. Gooch could see that the Hatch residence across the creek had nearly 2 feet of water in it.

Nearby Finn Creek long has been a trouble-maker for bottom-land farmers. Its appearance after May 10 and 11 was in marked contrast to the Owl Creek area which the flood-control work had protected.

Less than a mile separates the boundaries of Owl and Finn Creek watersheds in places. The bottom-land fields in Finn Creek are some of the richest farm lands in Oklahoma. For example, a little over 21 acres of bottom land farmed by L. J. Key produced more than 34 bales of cotton in 1949. Key's 1950 planting of cotton in the field was covered by sediment, and on 100 acres of his land he found the sediment from 1 to 12 inches in depth. Two weeks after the rain, Key was harrowing to dry out his land for another cotton planting.

Walter Gray, one of the biggest landowners in Finn Creek, was not discouraged by the work of the floodwaters that came across his bottom lands, but it was quite a jolt, he admitted. In 20 years Gray had spent $35,000 on levees and channel straightening to keep the waters off his land. After the May 10 and 11 rains, when the Finn Creek waters reached nearly to his house, there was probably more footage in breaks in his levee system than there was in levee that was left.

The flooding damaged 100 acres of his land, washing out his stands of corn and cotton, or scouring and washing the land away. On the Self estate across the road from him, the picture was the same—washed-out or buried crops.

"I guess I'll try to fix the levees again," Gray said. But he expressed great interest in a program of agricultural flood control.

"Stopping a flood before it gets started seems to me to be a sensible way to do the job I've been trying to do here so long."

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200 STUDY SOIL AT NINTH ANNUAL INSTITUTE

By WELLINGTON BRINK

TO the metropolitan crossroads of America came this year from its proving grounds in Ohio the now-celebrated Annual Institute of Conservation, Nutrition, and Health. To Chicago, famed market place for grain and meat and farm implements, came the men and women of the soil on which the city grows and thrives. Here gathered in July 200 and more Friends of the Land to consider the substance which is the chief source of all life, the soil.

The institute now is nationally important. It deals each year with some transcendent theme. Last year the theme was water, this year soil. And always, above every field of inquiry, hovers the question of human health and advancement and final destiny.

We owe much to Friends of the Land for marshaling for these events the newest findings of laboratory and experiment station, the freshest

approach, the boldest and bravest ideas; for bringing together a panel of distinguished speakers, and a membership of men and women capable of threshing out the good kernel and carrying it away for planting in their home communities.

In the pattern that was so outstandingly successful at Tar Hollow, Coshocton, and Athens, Ohio, the Ninth Annual Institute achieved another triumph in two memorable days at Chicago, July 6 and 7. It opened with a statement of purpose by Ollie E. Fink and closed with a summary by Jonathan Forman, the educator-doctor team whose genius originated the conference and has guided its destinies through nearly a decade. For the first time, it included a dinner, attended to capacity, which presented the geographer-explorer Dr. Earl P. Hanson, of the University of Delaware, and the famed author-Malabarfarmer Louis Bromfield. Hanson berated the pessimists and pointed to the agricultural-industrial opportunities in various remote parts of the world. Bromfield, always informative and inspiring, told his famous chicken-litter story which is one of the many good yarns in "Out of the Earth" (see September's SOIL CONSERVATION Magazine).

The institute dealt with the first fundamental, Soil: The Cradle of Life. It explored soil's physical structure and chemistry and microbiology, delved into uses and economics, deliberated on nutrients and their effects on plants, livestock, and people. It wove a texture of understanding, a concept, calculated to lift soil out of the realm of the abundant commonplace to that of an exciting, beckoning frontier for further exploration. The institute found in Chicago not only the roar of factories and the tensions of business but also unsurpassed facilities for communication and transportation; it was at home where universities and research centers are at home, where dwell so many Pulitzer and Nobel prize winners and other men and women of the learned professions—and for the same reasons.

Out of the institutes have come the extra dividends of books of enduring character. Water and Man: A Study in Ecology (Friends of the Land. $4.50) is the most recent—a significant volume by Forman and Fink which pulls together the proceedings of last year's institute and includes a few additional chapters for good measure.

Paul Sears observes in his foreword to this book: "No phase of our environment registers disruption more sensitively than the water cycle. No phase affects human welfare more directly and profoundly. Across the land from Los Angeles to Manhattan, on farms and in villages as well as in great metropolitan centers, there is insistent concern over the growing thirst of our civilization, the thirsts of men and beasts, of field and foundry. . . . Those two notable impresarios, Messrs. Forman and Fink, have done some amazing things in the cause of conservation. But I seriously doubt if anything they have done will outweigh in value and importance the book which follows this brief note."

Here may be found some of the answers to water shortages. Here are compared the work of the valley authorities and the accomplishments of the Brandywine Valley Association and the Muskingum Watershed Conservancy District. Here set forth is the menace of water-borne diseases through stream pollution. Nowhere else that I know is there such a useful one-volume compendium of water information available to the expert or the layman. "Water and Man" is a working tool for the conscientious public servant, for the public-spirited private citizen, for the conservation student.

The institute and its books are among the many evidences that Friends of the Land has come of age. Its lusty membership of 10,000 is by no means a measure of its strength and influence. Friends of the Land is a fraternity of community leaders, drawn from all parts of the Nation, representative of a variety of professions and businesses. It has a wide wingspread, speaks with freedom and intelligence, directs a vast auxiliary following. It includes writers, orators, actors, painters, lawyers, bankers, merchants, railroad executives, farmers, scientists, gardeners, housewives. It speaks brilliantly and well through its unique quarterly magazine, *The Land*, edited by the equally unique Russell Lord, who is accorded support in the art department by his talented wife Kate. It chats briskly of issues and activities in *The Land News*, whose editor is the colorful and versatile Jonathan Forman.

Chapters mushroom, membership expands, as the good works of Friends of the Land become known. Once again is demonstrated the eagerness of Americans to flock to an organization that is fighting the people's own fight.

QUOTES FROM THE CHICAGO MEETING

EARL PARKER HANSON, chairman, department of geography, University of Delaware: The concept of overpopulation is utterly meaningless except in terms of poverty, ignorance, hunger, and ill health. It is never a land that is overpopulated in terms of inhabitants per square mile; it is always an economy, in terms of inhabitants per square meal. The land cannot be stretched, but the land's productivity, meaning the economy, can be stretched and is being stretched everywhere. And the conservation of the soil must be, and is coming to be, regarded as a function of that stretching.

The day of specialized, departmentalized, one-sided thinking is now all but over. The men, for instance, who plan Puerto Rico's current astonishing progress through production, cannot specialize in agriculture, or manufacturing, or legislation to bring about social reform. They cannot draw boundaries between those activities, but must think of the island and its people as one whole.

As a world movement, the point-4 idea today marches on inexorably for the simple reason that it is demanded by somewhere between 1 and 2 billion human beings who are tired of being regarded as mere cheap labor. The restlessness and the growing determination of those hundreds of millions constitute a force, a power, a weapon if you wish, far stronger than those of all the atomic bombs we can manufacture. And the survival of our civilization and culture that the Jeremiahs talk about can be attained only through going along with that restlessness. Survival today is possible only through rapid progress. And progress of the world, of our world, is possible only through rapidly accelerated production everywhere.

DR. GEORGE K. DAVIS, animal nutritionist, Florida Agricultural Experiment Station: With wild animals, the unrestricted range protects from intense deficiency. In cattle, goats, and sheep, which are limited in their range to deficient areas, the animals suffer in spite of apparent adequacy of feed, unless supplements are provided. Experimental work has shown the relationship of phosphorus to animal health. In Minnesota, cattle on a deficient ration consumed as much as one and one-quarter times the feed necessary for maintenance, but lost weight. Supplied with a phosphorus supplement, the animals made good use of their feed and gained rapidly in weight and condition.

Calcium is so closely tied to phosphorus in nutrition that it is almost impossible to consider the one without the other. Ninety-nine percent of body calcium is in the bones, but the remaining one percent is essential for many body functions ranging from muscle activity to energy metabolism. Calcium is necessary for milk production, and a deficiency will result in lowered milk yield, starvation of the young, and a weakened condition of the female, as well as reduced returns to the farmer.

When insufficient copper is present, the general poor condition seems to be associated primarily with the anemia which develops under these circumstances.

Another element which has caused spectacular effects is cobalt. The amount of cobalt required by a ruminant animal is small compared to the other nutrients. Less than 0.1 part per million of cobalt in the feed, or 1 milligram a day, will take care of the needs of a 1,000-pound cow. A cobalt deficiency in feeds causes a decrease in appetite, and looks like starvation. With depressed appetite, the animal will often not eat sufficient feed for maintenance.

With anemia there is always the possibility of a need for iron. The amount of iron required by an adult animal is quite small due to the ability of the animal to retain iron and reuse it. When young animals are in an area low in iron, they respond rapidly to iron supplements because of their need for iron in blood formation.

Blood loss due to parasite injury or insect damage or to any blood loss may result in a need for iron that can be supplied by iron supplements. The anemia of iron deficiency is somewhat different from that seen with copper deficiency and cobalt deficiency. It occurs in some areas where insect injury is at a maximum. If the insects cannot be controlled, it pays to feed to these animals iron supplements.

Some observers have offered this as the reason for deer licking iron outcroppings during the summer and fall periods after a season of heavy insect attack. Deer subjected to insect attacks over a period of several months lose relatively large amounts of blood and might have need of a definite supplement of the mineral elements such as iron.

Continuing investigation and research of animal needs in terms of forage nutrient content and this related to the soil nutrients is the price of continued animal health. With increasing production of feed, and more rapid development of animals, the need for increasing knowledge of the nutritional requirements is intensified. As a popular song once put it, "It's the little things in life that count." Trace elements are important in animal health.

DR. ELIZABETH McCOY, professor of agricultural bacteriology, University of Wisconsin: Without its microorganic life, soil would not be the dynamic, perpetual system that sustains all plants and in consequence all animals. The basic mineral structure of the soil, though important chemically and physically, is merely the habitat of the life of the soil. And of that life, the bacteria and their near relatives among the fungi are unquestionably the key to the biologic balance in the soil. It is trite but true that the cycle of elements would run down, if it were not for the microorganisms. They are the agents of decomposition of the organic matter tied up in plant or animal bodies. For their own purposes, the microorganisms take a small share of the necessary elements for growth of their own cells, but infinitely more important, they release for plants the major share of

those elements from bound form in complex organic matter.

Working upon the organic wastes excreted or upon the dead bodies of plants and animals, they hydrolyze and ferment and oxidize to obtain energy for their life processes. By working in relays, one type carrying on the decomposition when another leaves off, they eventually carry the decomposition to completion; i. e., they return the carbon to carbon dioxide, the nitrogen to ammonia and so to nitrate, the sulfur to sulfate, the phosphorus to phosphate, etc. These are the nutrients for plants and they, in turn, are nutrients for animals. Thus, the soil, because of the life within it, becomes a great digestive system, and the cycle of elements is perpetual.

What comprises the microorganic life of the soil? It is conveniently described as microflora and microfauna, and consists of the following groups:

	Average weight in pounds per acre-foot of soil
Bacteria	500–1,000
Fungi (molds, etc.)	1,500–2,000
Actinomycetes	800–1,500
Protozoa	200– 400
Algae	200– 300
Nematodes	25– 50
Other worms and insects	800–1,000

Taken together, they amount to 3–5 tons per acre-foot of soil, which is a very considerable crop, comparable to plant or animal crops. Such figures are of interest but they still do not tell the story of relative importance. Average populations in a fertile soil are more indicative:

	Average numbers per gram of soil
Bacteria	1,000,000,000
Actinomycetes	10–20,000,000
Fungi	1,000,000
Protozoa	1,000,000
Algae	100,000
Nematodes	10–50

Most of these microorganisms are found near the surface of the soil, usually within the upper 6 to 12 inches, and this stratification is a direct example of the ecological relations within the soil. Proper moisture, temperature, and aeration, as well as the greater concentration of organic matter as food, favor the microorganic population in the surface zone. Within the zone there may still be localization of types in a micro-ecological sense; in fact, there are many examples of particular populations of cellulose fermenters, pectin fermenters, urea fermenters, putrefactive bacteria, etc. springing up in conspicuous numbers in response to their specific food in the form of plant or animal residues.

Consequently, whenever barnyard or green manure is plowed under on a field, there is an immediate surge of life. The easily decomposable organic matter, such as sugars, proteins, etc., are quickly attacked and decomposed. The more resistant organic matter such as cellulose, lignin, and waxes of plants and chitin of insect bodies and the like are slow to decompose. In fact at any one time, there is an accumulation of partially decomposed resistant organic matter, to which we give the name of humus. It is the mass of partially decomposed organic residue of plant or animal or bacterial bodies, together with some compounds synthesized by the soil bacteria. It is not a stable compound or even mixture of compounds, because it is constantly undergoing slow further decomposition by soil microorganisms. Humus is dark brown in color and much of it is in colloidal state. There are several theories as to its biochemical formation. What may be called the humus-nucleus consists of lignoproteinates combined with bases, with phosphates and silicates to form still other complexes. Thus, humus also serves an important role in the base exchange in the soil.

The amount of humus in soils varies widely. In waterlogged soils, which are relatively anaerobic, humus accumulates to between 20 and 50 percent of the dry weight of the soil. Such soils are low in fertility because their plant food is tied up in the organic form, waiting upon hydrolysis and oxidation to make it available. In loose-textured sandy soils the organic matter is rapidly and completely oxidized so that little humus accumulates. The ideal situation is the intermediate where there is a reserve of humus, in the range of 5 percent, with conditions allowing the bacteria to convert it to plant food as needed. Thus, humus is a key "compound" in soil, and proper soil management has as one of its chief objectives to encourage bacterial formation of humus.

DR. GEORGE D. SCARSETH, director of research, American Farm Research Foundation: In general, soil tests help to estimate the *supply status*, tissue tests help to indicate the *first limiting nutritional factor*, and deficiency symptoms indicate *extreme and damaging shortages* in the plant. These are all practical diagnostic aids that no fertilizer research person or extension fruit, vegetable, or crops specialist, or properly trained person interested in better fertilization can afford to omit. Our agricultural colleges could render a valuable service by training students in these diagnostic procedures.

DR. EMIL TRUOG, chairman, department of soils, University of Wisconsin: The scientific study of the chemistry of soils started just about 150 years ago. In George Washington's time, very little was known of the chemistry of soils or the composition of crops, and hence, the nutrient elements which soils must supply to make saisfactory crop production possible. Nothing at all was known about soil acidity and the inoculation of legumes. That is probably the main reason why Washington found it difficult to grow clover, and failed utterly in his attempts to grow alfalfa. It is now known that the soil on his fields was strongly acid. Because much, if not most, of Washington's time in his later years was devoted to problems of soil management and crop production, one can well imagine that satisfaction which he would have derived had it been possible for him to participate in an institute of the kind being held here today.

In considering the composition of soils in relation to the plant nutrient elements derived from the soil, it is well to recognize that these particular elements make up only

5 to 10 percent of the weight of soils. Is the other 90 to 95 percent of soils mere filler or ballast? No. It provides the framework of soils which is just as necessary in the make-up of a medium for plant growth as the nutrient elements themselves. Three elements—oxygen, silicon, and aluminum—usually make up most of this framework. They exist in combination with each other, in the form of resistant minerals called silicates. They make up both the coarser (sand) and finer (clay) fractions of soils. The nutrient elements in various combinations exist intermingled or dispersed within this framework in rather fine subdivision for the most part.

Soils contain varying amounts of organic matter, ranging usually from 2 to 3 percent up to 6 to 7 percent. This organic matter, like the mineral matter, is made up largely of non-nutrient elements. It contributes to both the framework of soils and the store of nutrient elements, and serves as the main food supply of soil bacteria which give life to a soil.

Perhaps the most important chemical property of a soil as regards its fertility is its reaction or pH. The main reason for this is that the pH of a soil profoundly influences the availability of all of the nutrient elements. In the humid region, soils tend to become acid because of the loss of bases by leaching. Fortunately, this loss can be made up through the addition of lime and fertilizers. Results of numerous experiments show that a pH of 6.5 (just very slight acidity) is a favorable reaction as regards availability of plant nutrients, activity of soil bacteria, and other desirable conditions which promote soil productivity.

In the treatment and management of soils we are often concerned largely with the supply and availability of the nutrient elements. Fortunately, both the supply and availability can be made more favorable through feasible practices of soil management, including additions of lime and fertilizer.

In connection with the addition of lime and fertilizer to soils to make them efficient producers, it may well be asked just what happens to these additions? Is there not great danger of loss of fertilizer elements by leaching? Or does not the soil fix them so that they are no longer available for crop use? It is an apt simile to say that a good soil husbands a heavy dose of fertilizer, just as a frugal person would husband a legacy of say 1 million dollars in cash.

DR. ROGER H. BRAY, professor of soil fertility, University of Illinois: I am going to tell about my new concept of elastic fertility—why yields of crops can vary tremendously without varying the fertility requirements for phosphate and potash and all the rest of the nutrients except nitrogen, and why nitrogen is an exception to this law. Elastic fertility adapts itself to any sized yield at one end of the elasticity scale (K, P) and fertility which is good enough for only one-sized yield at the other end of the elasticity scale.

I want to tell how this elasticity concept explains many phenomena heretofore not explained by former soil-fertility concepts. It explains why most nutrients work on a percentage basis and at least one, N. works on an absolute basis. It tells why you have to have, in many cases, just as much fertility in the soil for low productivity as for high productivity if you want crops of the proper composition. It shows how to control fertility by determining the proper soil levels and maintaining them at the proper levels by soil testing. It tells why the soil type is no longer considered a fertility unit and why we can use the same recommendations on a wide variety of soil types. It explains why we do not have to worry about the law of diminishing returns in fertilizer use—a false philosophy which has held back soil-fertility build-up for the last 100 years.

DR. JOHN F. TIMMONS, professor of land economics, Iowa State College, Ames, Iowa: Ever since man was evicted from the Garden of Eden, he has been much concerned with utilization of land resources as the basis for his survival and for the improvement of his level of living. Only very recently has man in this and a few other nations fallen into the dilemma of producing more from land resources than he can get distributed and consumed. Apparently, the pressure of food supply upon population is beginning to replace the pressure of population upon the supply of food in this small sector of the world.

Examination of current land programs and policies in this country reveals some basic confusions and conflicts that warrant serious consideration by all citizens.

Objectives of land utilization start and end with man. Land is important only to the extent and manner in which it contributes to peoples' wants. Since land is not productive until used with capital, labor, and management, the objective of land utilization is one of getting the most of the things people want out of the land in return for the least amounts of labor, capital, management and land used in the process. The objective is truly one of economizing our total resources, including labor, capital, and management, as well as land.

Since the purpose of land utilization is to provide people with the things they want which can be obtained from land, attention should be given to the wants of people. In an effort to get those things produced at least cost which people want most, increased attention must be given to population composition and distribution and to the changing preferences of consumers.

In satisfying today's wants, care must be taken that land resources are not used up, but instead, maintained in order that tomorrow's citizens will continue to satisfy their wants. This problem of balancing satisfaction of present and future wants is the heart of the soil conservation problem. Its solution begins with an approximation of what the future wants may be. This involves consideration of population growth, living levels, foreign trade, and technological improvements.

Although most of the agricultural land of the Nation is in private ownership, public interest forbids individuals to exploit their land to the detriment of future generations. Land resources are not the absolute property of any particular generation or individuals. Public welfare demands that the land be used in such manner that the benefits from land will be maximized over many generations.

Apart from the several agencies now concerned with land use, there is a real need for a continuing national agency not involved in the administration of any particular land program, to integrate, study, plan, evaluate, and recommend programs and policies concerned with the utilization of the Nation's land resources.

DR. K. STARR CHESTER, supervisor, Agricultural Division, Battelle Memorial Institute: Completely nutritive foods can be produced only on soils that contain adequate amounts of all the minerals that are required for normal plant and animal development. Many of our soils are deficient in some of these minerals, which must be restored if the soils are to be the cradle of a healthy society based on a healthy agriculture.

Restoration of lacking minerals in our soils in a rational manner calls for means, such as do not now exist, for completely analyzing soils and agricultural products for all the essential minerals. This need can be met most economically and effectively by the establishment of a central, national analytical facility.

Here the best of modern analytical methods can be combined with the economy, uniformity, and reliability of modern production-line processing, so as to furnish, at low cost, the hundreds of thousands of complete mineral analyses that are needed. The laboratory would not make recommendations on soil improvement, but, like the clinical laboratory behind the family doctor, it would enable farmers to receive better counsel on restoring soil fertility from their local agricultural advisers.

So that this service can at all times be guided by the best of modern technical understanding, it should be under the advisement of a council of leading authorities in soil science and nutrition.

The initial installation will be costly, but the volume of analyses, which is assured, should soon place it on a self-sustaining basis. Considering the significance of this service to agriculture, conservation, and human health, and its scientific soundness, it is believed that the cost of establishing it will be forthcoming.

DR. HELMUT KOHNKE, department of agronomy, Purdue University: Soil is made up of three main components, the solid particles and the liquids and gases in the pores. Each of these parts is essential for plant growth. The condition of the water and the air in the soil depends on the size, the composition, and the arrangement of the solid particles, but also on the climatic conditions and the activities of man. It is the task of the soil physicist to study and organize these facts and to recommend the type of management that will result in the greatest sustained crop growth.

DEATH ON SILT-COVERED HIGHWAY.—Last June the *Osceola* (Iowa) *Tribune* carried the following story:

"Mrs. Leon Solakian of New Haven, Conn., was killed when the car in which she was traveling skidded on silt washed on the highway 6½ miles east of here. The car plunged down a 12-foot embankment. Four other occupants of the auto were not injured."

BUSINESS AND FARMING JOIN HANDS

By CAL L. ROARK

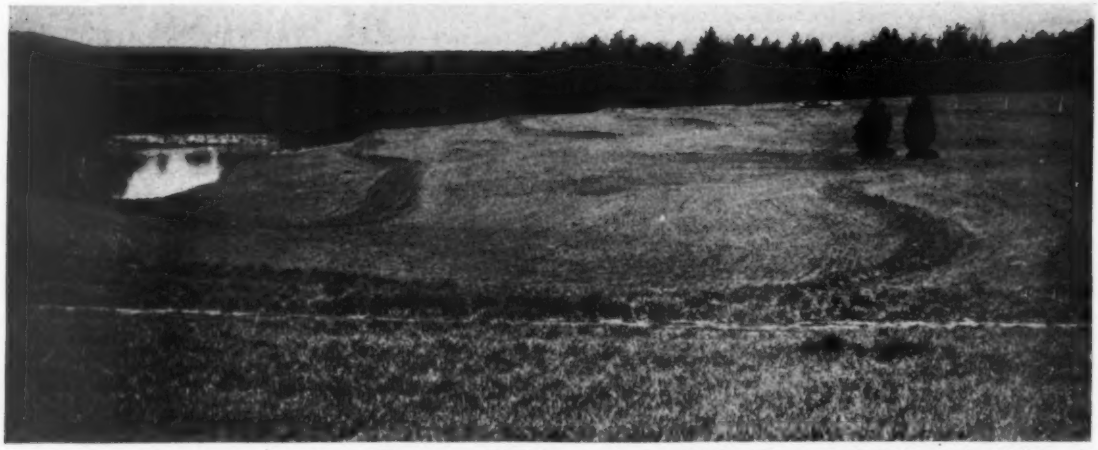
BIG BUSINESS can be a good landlord. Recently I visited R. E. Rhyne, the land agent who looks after about 14,000 acres belonging to the Duke Power Co. west of the Catawba River in North Carolina. This and other property in the Carolinas was bought primarily for reservoir sites. District Conservationist J. D. Miller and SCS Technicians E. F. Burgess and Clarence Hood, who help farmers on this land with soil conservation, have found good land use the first rule with Rhyne and the farmers working on company farms.

Two things impressed me: First, the evidences of down-to-earth, practical, business farming and forestry management on company lands. No fancy farming or show-off stuff goes—just good practices equal to those carried on by others in the community. Second, the democratic procedures that are followed in company relations with the farm families tending Duke land and with others in the area. These farms and families are simply parts of the communities, no better and no different from the others who are participating in local agricultural programs.

Take for example Duke's participation in the work carried on in soil conservation districts. These families engage in both educational and actual on-the-land activities in about the same proportion and with about the same results as do others in their communities.

Rhyne is a quiet, mild-mannered man in his early fifties. He told me that all of the economical farm units are farmed by families on a share basis. Duke handles directly, however, all of the woodlands, reforesting land best suited to that use, and practicing scientific, practical forestry management on existing woodlands. Forestry and other land-management work on the Duke system of farms is under the direction of C. J. Blade of Charlotte, N. C.

NOTE.—The author is in the information and education division, Soil Conservation Service, Spartanburg, S. C.



Dense sod now blankets once-idle land. The spring filled the pond. Land Agent Rhyne stocked the pond with bluegill and bass and fertilized the water. Now the Catawba County farm is being stocked with registered Herefords to harvest grass and turn it into cash.

In Rhyne's area about 300 acres have been set to trees in the last 2 years. The company uses a tree-planting machine to speed up this phase of conservation. And when crews are setting trees, thinning pines, or making selective cuttings on company lands, these operations are often used as demonstrations for the farmers nearby. This has helped a lot in getting others to adopt good forestry practices.

Blade said that the company has planted pines on 8,000 acres of badly eroded farm land, most of it in South Carolina. He noted: "Due to this reforestation and the work of the SCS on adjoining farms throughout the whole Catawba River watershed, our lakes are continually becoming clearer."

Rhyne and other Duke officials encourage participation in soil and water conservation. To this end, Duke maintains a few demonstration farms as "proving grounds" for practical and profitable soil and water conservation practices. The 320-acre farm in Catawba County where Rhyne lives is one of these demonstration farms. Another is the W. K. Stutts farm at the Catawba-Iredell County line on Highway 150 near Sherrill's Ford.

The Stutts farm is used as a meeting place for Duke farm families and their guests. The roomy farm home sits in a beautiful grove of large oak trees surrounded by alfalfa. It is here that about 600 Duke families from the Carolinas gathered at the last meeting along with invited guests. Barbecue, drinks, basket lunches, square dances, baseball games, and horseshoe pitching were enjoyed.

At each meeting on the Stutts farm there is always a distinguished speaker. Senator Clyde R. Hoey, Dr. H. H. Bennett, and Senator Cameron Morrison have made addresses here.

The farm Rhyne lives on and manages gradually is being stocked with a herd of registered polled Herefords. Although most Duke farmers do not have commercial herds, Rhyne figures that they will later want to add a few good beef cattle from the registered herd on this farm.

On Rhyne's proving grounds are several practices expected to spread over the entire farm system. An example is strip cropping. This farm was terraced, but some of the terraces broke and did not control runoff until strips were added. Since then, the terraces have worked well and the soil has stayed in place.

Part of the farm along the road displays a 25-acre field of Ladino clover-orchardgrass pasture with a modern farm fish pond in it. People know that this land was formerly idle but now is one of the best spots on the farm. Wildlife border strips and bird food patches are also included.

Many Duke farmers have undertaken complete soil and water conservation plans. All of them, both colored and white, are doing limited conservation work. Rhyne told me: "When I think a man has advanced enough to start a complete program, I suggest that we get the SCS technician to help us fix up a plan for the farm. Every now and then, the farmer will confess that he already had decided it was a good thing.

"That's what we try to get every man around

to, but we're satisfied if they advance as fast as others in the community."

E. F. Burgess explained that Rhyne's method of encouraging cooperation in soil conservation suited Catawba district supervisors. "We're mighty glad that when these farmers ask us to help them, they're really prepared to start carrying out a well-balanced conservation plan."

Duke provides other inducements to their farm families to do conservation work. Company-owned bulldozer, terracer, and crawler tractor are used to smooth over gullies, build terraces, make ponds, and do other earth-moving jobs. The company also furnishes some seed, lime, and other materials to get each farmer started.

"We bear the expense of doing the conservation work which does not provide immediate benefits to the farmer such as the more permanent practices of terracing, tree planting, fencing, permanent pastures, and so on," the land agent explained. "And of course where that is done we get such benefit payments as are earned under the PMA program."

Some of the many soil and water conservation practices which Duke farmers are applying in addition to terracing, tree planting, and ponds, include strip-crop rotations, fertilizing and liming, alfalfa and pasture establishment.

There's very little moving away from Duke farms, according to Rhyne. Most farmers stay year after year. "Why, O. L. Beatty's been on one farm 2 miles south of Terrell since the middle 1920's. Last year he made as much as 100 bushels of corn to the acre. He was in the top five of the county in corn yield. His son, a 4–H Club boy, made a still larger yield—had the highest 4–H Club corn yield in the county."

I queried Rhyne about what seemed to him to be the main reason why Duke farmers took hold of soil conservation work so well. "When they realize that applying a conservation practice will make them more money or make the farm more attractive and livable, they're ready for it," was his reply. "There's a fine spirit of competition among these fellows, too. When one does something that works out well, others take it up."

Incidentally, Rhyne's son Rufus is an assistant county agent in Stokes County.

COLLEGE ANNUAL.—Soil conservation occupies eight pages in the Cherokee Phoenix, 1950 annual of Reinhardt College at Waleska, Ga.

AROOSTOOK'S CHANGING AGRICULTURE

By HENRY E. LIBBY

AROOSTOOK County, Maine, is beginning to get diversified farming.

Earlier it had a beginning in diversification, but it lacked processing plants and wholesale outlets for beef, dairy products, and various crops. The first important step was taken when a freezing plant was established in Houlton, with viners located in various areas and an extensive contracting of pea acreage.

The next forward move came when a milk-receiving plant was built in Island Falls. It has done a lot to promote soil and water conservation through pasture improvement, better seeding mixtures, and increased grassland farming.

Aroostook produced the all-New England winner in the Green Pasture Contest—Beverly Rand. His farm is in the town of Sherman, and it is a good example of Aroostook's new agriculture. After Rand was graduated in agriculture from the State University he returned to the farm to put his knowledge to practical application.

His lush Ladino, timothy, and brome pastures have been seen by many, but he is not a grassland farmer. With the help of Soil Conservation Service technicians, he is hunting methods of diversification which will enable him to rotate part of his land in three cash crops. Peas are harvested and shelled on the farm. The viner deposits the vines in a 200-ton trench silo, attached and based on a level with the dairy.

There also is an upright 50-ton silo for grass silage. Home-grown grains are ground and mixed—8 pounds of barley, 8 pounds of oats, and 4 pounds of a 32-percent supplement—as feed concentrate. The Ladino and timothy rotation is used as pasture and hay and gives a good legume cover to plow under for potatoes.

This farm had only one field in permanent grass during 1949. There was an excellent stand of Ladino and smooth brome. Rand also started to renovate an old 25-acre pasture, bring it into produc-

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NOTE.—The author is district conservationist, Soil Conservation Service, Island Falls, Maine.

tion and put it to the credit side of the farm ledger. Being knolly and covered with scatterings of cedar, fir, and raspberry bushes, it had not been contributing to the farm income.

The Southern Aroostook Soil Conservation District, with which Rand has been cooperating since 1942, helped him locate a contractor to pull out the trees. Then, working with a crawler tractor and bog harrow, the contractor put the area in shape for liming, fertilizing, and seeding to a permanent pasture mixture. This work included construction of a water hole for stock water.

The New England Green Pasture Contest winner is not content to sit on his laurels. He is striving to improve his pasture and farm set-up. Of 435 acres, approximately 200 are under cultivation and 25 are in improved pasture. The remainder is old wooded pasture and woodland.

This year the farm enterprise consists of 68 acres of potatoes, 55 acres of peas, 24 acres of barley, 53 acres of rotation hay and pasture, and 25 acres of permanent pasture. The farm supports 70 head of registered Holsteins—28 milkers, 2 bulls and 40 head of young stock. He keeps about 1,000 laying hens in a remodeled barn.

All this brings a cash income to help defray stabilized costs. It eases farm labor and blends into a more permanent agriculture.

PROGRESS IN SOIL CONSERVATION

(Continued from page 54)

completely and finally decided in any such manner. In large degree, it will be resolved at the corner grocery store, on Saturdays by farmers who go to town, on Sundays after church services, and in scores of other country places where farmers ask other farmers the pertinent question: "How much did your soil conservation work increase your per-acre yields; how much did it increase your net income? Did some of your increased income go to the Nation's treasury as income taxes?"

And business and professional men and women, and city people, too, will inquire about the welfare of the land.

The answers are going to be on the positive side of the ledger, both for the individual and the people as a whole.

These are deeply rooted views; they stem from my 47 years of work on the land. I feel good about the results. I sincerely believe that any turning back now would mark the beginning of grief for the Nation.

REVIEWS

THE ESTABLISHMENT OF VEGETATION ON INDUSTRIAL WASTELAND. By R. O. Whyte and J. W. B. Sisam. Commonwealth Bureau of Pastures and Field Crops and the Commonwealth Forestry Bureau. Aberystwyth, Wales, Great Britain, 1949. 78 pages. Illustrated. $1.40.

The authors of this volume are of that group of Britons, the Aberystwyth clan, known as masters of the art of compilation in the field of agricultural science. They seldom theorize in their publications, but they do present the problem faithfully and give you the known facts and accomplishments regarding the solution on a world-wide basis. In this book they deal with methods which have been used successfully to reclaim land devastated by the dumping of deep-mining wastes, strip mining, and the piling on the land of unused and mostly unusable materials by steel, brick, pottery, glass, chemical, and other manufactures, as well as a host of lesser industries essential to our present-day economics and living. There are about 60 photographic illustrations, revealing to the eye both the difficulties and the remarkable results where science and persistence work hand in hand to establish profitable woodlands and even good forage crops on industrial wasteland.

The information given on revegetation methods used on such areas in England, Scotland and Wales, the United States, Germany, France, South Africa, and the island of Cyprus, was gathered meticulously from the existing scanty bibliography on the subject, and to a large extent by correspondence and personal observation. After discussing the extent of the problem in these countries, the authors give us chapters on types of industrial wastelands, treatment before planting is begun, and then a detailed treatise on the best-known ways of establishing trees and shrubs, or pastures and other herbaceous cover, on these utterly ruined and scrambled lands. At the end of the book, S. H. Beaver's methods of surveying derelict land in the English Midland countries is outlined, for those who may wish to use it, or as an aid in developing other survey methods to fit conditions wholly or partially different.

Apparently the book went to the printers just before the British Government's order restricting the surface working of coal and requiring land-restoration contracts before mining is begun, went into effect. There is no mention of the land-conservation regulation now in force in England whereby the topsoil must be removed and piled, and then the subsoil piled separately for returning to the land after mining is finished. See Grover Brown's "Strip Mining and Land Restoration" in the December 1949 issue of SOIL CONSERVATION. And, if interested in similar methods recently used in Harrison County, Ohio, see the *Ohio Farmer* for October 15, 1949.

From a practical viewpoint, the most valuable parts of the book are those which deal with the factors to be considered before treatment is applied to these waste areas,

and the chapter on establishment of vegetation by artificial means. Whether the area consists of old spoil mounds or of newly stripped or dumped materials, it is best to study it intensively, for revegetation is a tricky business and any one unfavorable factor may mean failure.

Can the surface be stabilized in the beginning to prevent erosion? Is a weathering and settling period necessary? Are there any plant nutrients in the material on top of the area? Is it acid or toxic? Are there escaping gases? Is leveling possible or would it help any? If nitrogen is lacking, are there any nitrogen-fixing plants that will grow in the climatic and "soil" conditions? Are soil-moisture and drainage conditions in the seedling root zone conducive to plant growth? Is it too hot, cold, or windy for the establishment of vegetation other than pioneer growth requiring many years? Will the land be maintained and the vegetation cared for once it becomes established? To cut down on costly failures, the authors are convinced that revegetation specialists must know the answer to these and other questions before attempting to restore spoil land for timber, grazing, or other farm crops.

In their chapter on revegetation of spoil mounds, they recommend, in general, the planting of trees and shrubs on steep mounds and the making of pastures on ground that can be leveled. Areas reclaimed for pastures should, of course, be free from poisonous fumes. And topsoil should be spread on the surface or, if this is not possible, the surface should be conditioned over a series of years by mulching, growing mixtures of pioneer plants and disking in, fertilizing and using all available organic materials such as sewage sludge, and controlled grazing by livestock, as the plant succession is gradually built up to the haycrop-pasturage stage. Even then, the pastures must have the best of care year after year, else they will deteriorate rapidly.

Several useful planting tricks are revealed as one reads of unusually successful revegetation experiences in England and our Central States. For example, when converting an old spoil mound into a woodland, if there's a coarse sod on the site, cut out a square of it and place upside-down in the planting hole—then sow seeds of lupine in the inverted turf. And, in the final step of establishing pastures on spoil land, use many different legumes and grasses, both early and late, in the seeding mixture—and drill in the seed, 2 inches deep on the poorer areas.

—PHOEBE O'N. FARIS.

NOTES FROM THE DISTRICTS

COURT CONTRACT.—When the Fiscal Court of Logan County, Ky., entered into an agreement with the Logan County Soil Conservation District for a plan on the county farm, they asked the SCS planning technician to estimate the cost of the practices planned for application in 1950, so that funds could be budgeted. The court then inserted into its contract with the tenant operator of the county farm the following clause: "The tenant agrees to operate said farm under the supervision and orders of the Fiscal Court and according to plans, rotation programs, and soil conservation practices as recommended by the local soil conservation district."

GEORGIA RECORD.—About one-fourth of the farms in Georgia, containing nearly half of the State's farm land, have soil and water conservation plans which SCS technicians helped their owners prepare.

In the Ocmulgee and Flint River Soil Conservation Districts, farm planning has been completed on more than a million acres.

By last spring the Broad River Soil Conservation District in east Georgia had the largest number of plans—4,749, covering 593,031 acres.

Five other districts have passed the half-million mark in acres planned, and 13 districts have more than one-fourth million. Three of the newer districts have not reached the latter mark.

CONSERVATION WORKSHOP.—According to R. H. Musser, the Kiwanis district of which the Milwaukee Kiwanis Club is a member has made reservations for a 4-day conservation workshop beginning August 9 at the Trees for Tomorrow camp at Eagle River, Wis. Musser, regional director for the Soil Conservation Service, is a member of the Milwaukee Kiwanis Club's Agricultural and Conservation Committee, having served as chairman in 1948.

The Trees for Tomorrow camp has completed lodging and classroom facilities for 45 persons. Lectures and tours will be conducted by staff members of the State conservation department, the Forest Service, and other conservation leaders. The class this year will visit State forest projects, fisheries, nurseries, and wildlife developments.

CITY PROTECTS WATERSHED.—With assistance of SCS technicians in the Pine Mountain (Ga.) Soil Conservation District, the city of Manchester has developed a conservation plan for the protection of the entire watershed from which it obtains its municipal water supply. The water comes by gravity from three small mountain streams. The city has purchased the 1,400 acres in the watershed of the streams and is carrying out a reforestation program. About 320 acres of open land have been reforested and the remaining 200 acres will be planted within the next year. Adequate fire protection and wildlife-conservation measures are included in the plan. When reforestation is complete, a new reservoir will be built to increase the storage capacity of the municipal water supply.

Winners and trophy.

JINGLE CONTEST.—The board of directors of the Manistee (Mich.) Soil Conservation District recently conducted a contest among the six county high schools for the best slogan on soil conservation. The board sent each school 16 pieces of masonite, 8 x 12 inches in size, painted yellow and ready for lettering. Rules of the contest limited each jingle to not more than 16 words. The shop classes of the schools did the lettering for the entries chosen.

The lettered masonite signs, ready for highway use, were presented to the district board at its annual meeting, and judges were named to select first- and second-place winners. The winning jingle was written by Joanne Ware and Joan Nugent of Bear Lake High School: "Save Our Soil, Save Our Nation. Save It by Soil Conservation." The English class of Kaleva High School took second place with "Everybody Loses When Erosion Wins. Practice Soil Conservation."

Director Harry Taylor of the district board presented blue spruce trees to the winning schools. The trees will be planted on the school grounds.

LEGION SPONSORS PROGRAM.—The Georgia Department of the American Legion is sponsoring a community agricultural program based on soil conservation farming, community leadership, and farm management for the 100,000 veterans now operating Georgia farms. Awards are planned at post, district, and State levels, with the State award scheduled for October 15.

The Soil Conservation Service and other agricultural agencies are being asked to cooperate in carrying out the program and selecting the outstanding veteran "living on and operating" a farm within each area. In the soil conservation phase of the program, each veteran will be judged on:

1. Adequacy of his soil conservation plan.
2. Percent of his plan that has been applied.
3. How well he follows up and maintains his applied soil conservation practices.

LOAN CONDITIONED ON CONSERVATION.—When a soil conservation district in Wisconsin attempted to follow through on a request for a farm plan, it found that the farmer had developed cold feet toward soil conservation work. Inasmuch as the request had been turned in by a local bank, a report on the farmer's attitude was sent to the bank. Within a week the request was renewed and this time the farmer was ready to undertake all the soil conservation work recommended. His loan had been refused until he got soil conservation practices started on his farm.

TREES AND FIRST GRADERS GROW TOGETHER.—A unique forestry project was started at the Alfred, Maine, public schools when 22 first-grade boys and girls appeared before the student body and planted a row of 22 Scotch pines along the schoolyard fence. Each pupil did the work on one tree with his own hands and feet, under the direction of Delbert L. Moody, SCS conservationist, who prepared the ground. When the boys and girls finish high school 12 years from now, the trees, under normal conditions, will be twice as tall as the average graduate and will form an attractive screen against adjacent land from which highway fill is taken.

MONEY-MAKING CALF.—E. B. Stowers, chairman of the Conecuh River (Ala.) Soil Conservation District, bought a 340-pound calf on February 6 and put him in a field of Caley-peas, crimson clover, and tall fescue. Eighty-six days and 220 pounds later, when the calf weighed 560 pounds, Stowers sold him for $128, or a profit of $70. The calf had no supplemental feed.

ORPHANAGE GROWS BICOLOR.—The Epworth Orphanage in cooperation with the Congaree (S. C.) Soil Conservation District has planted 8 pounds of bicolor lespedeza seed. The boys at the orphanage expect to get about 30,000 seedlings this fall. One-third will go to the district and the remainder will be sold by the boys to yield them some cash.

At sign: Andy Sorenson, Earl Widemann, E. John Nielson; director, president, director, respectively, Gloria Soil Conservation District.

IDEA FROM THE FAR WEST.—The next time you travel through California by car, keep an eye on the roadside markers. There's a new kind out there that is getting a lot of attention.

The signs mark the boundaries of soil conservation districts. They are official signs of a standard pattern being posted this year by the California division of highways. They are uniform throughout the State in construction and appearance.

Through arrangements with local districts, the division of highways posts the signs at strategic points on main-traveled highways, and then turns them over to district boards of directors at nominal cost. The latter agree to take care of maintenance.

Among the first of the new signs to be posted are those marking the boundaries of the Gloria and Mission Soledad Soil Conservation Districts in Monterey County.

At sign: A. L. Roccick, Alfred Binsacca, Manley Sullivan; president, secretary, director, respectively, Mission Soledad Soil Conservation District.

STATEMENT of PRINCIPLES

TEXAS BANKERS ASSOCIATION

Fort Worth, Tex.

May 15 and 16, 1950

SOIL AND WATER CONSERVATION

Members of the Texas Bankers Association recognize that productive land and a prosperous agriculture are essential to the economic welfare of communities, Texas, and the Nation. Texas bankers realize soil erosion by wind and water has already destroyed or damaged, and continues to damage, great areas of productive farm and ranch lands in Texas. Texas bankers know that the conservation and proper use of soil and water are necessary if the land is to be productive and our agriculture prosperous. We believe good progress is being made in conservation districts of this State, organized under the Texas State Soil Conservation Law of 1939.

Also, members of the Texas Bankers Association recognize that bankers have a responsibility in encouraging sound soil and water conservation in this State. And, so, we stress four points as follows:

1. We endorse work of the soil conservation districts and the Association of Texas Soil Conservation District supervisors, and urge bankers, individually, to support actively this work.

2. We suggest to the incoming Administrative Council of the Texas Bankers Association that a Committee of Soil and Water Conservation be set up to represent our association in counseling and working with the Association of Texas Soil Conservation District supervisors and with the Texas State Soil Conservation Board.

3. We recommend to individual bankers to become acquainted with and offer counsel to supervisors of their local soil conservation districts.

4. We recommend to individual bankers, who own land, that they ask assistance of their soil conservation districts in applying and maintaining a sound soil and water conservation program on their own land, and encourage other landowners to do likewise.

First Soil and Water Conservation Committee appointed by C. E. McCutchen, president, Texas Bankers Association, and president of First National Bank, Wichita Falls.

Claude Jones, chairman, Gainesville: W. Guy Draper, Temple; Pat Newton, Bryan; Ben L. Gill, Jr., Terrell; H. W. McGoldrick, Kenedy; T. C. Granbury, Dublin; W. J. Sloan, Brenham; J. M. Weinsapfel, Muenster.

U. S. GOVERNMENT PRINTING OFFICE: 1950

On this farm at Corozal, P. R., soil and water conservation measures have increased pineapple yields from 8 or 9 tons per acre to 14 or 18 tons per acre. The new practices have made 4 crops possible instead of 3 within a 4-year planting period. The crop sells at $40 to $60 per ton. Perez Vivivas is the SCS work unit conservationist there.

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